

I - Problem Statement Title (04-GS068)

Establishment of Updated Lumber Stress Values to Enhance the Safety and Reliability of Bridge Falsework

II - Research Problem Statement

Question: Do the current allowable stress values for timber that are specified in the Department's Standard Specifications for the design of bridge falsework accurately represent stress capacities for wood and timber commonly used today?

III – Objective

Determine accurate allowable stress properties for the timber material being used in falsework construction to reduce the potential of falsework failures and collapses. This would contribute to the Department's goal of achieving the best safety record in the nation.

IV - Background

Allowable stress values for timber within the Department's Standard Specifications for falsework were arbitrarily chosen over thirty years ago and currently do not comply with the National Design Standards (NDS) for wood and timber. Additionally, the quality of large timber members commonly used in falsework construction has degraded over the years. What may have been conservative allowable stress values thirty years ago may not accurately represent the material that is commonly used today.

V - Statement of Urgency and Benefits

A. Support of the Department's Mission/Goals:

(Improving Mobility: Safety, Reliability and Performance) Falsework designers typically take full advantage of the allowable stress properties of timber members. Inaccurate allowable stress assumptions could lead to falsework deficiencies and potential failures. Allowable stress values that more accurately represent the material that is commonly available and used by industry would provide safer falsework systems.

B. Return on Investment:

The contractors building California's bridges use millions of board feet of lumber each year. Properly assessing the strength of that lumber is critical for public and employee safety. If these values do not have a sufficient safety factor a falsework failure can occur costing a contractor \$100,000s in lost time and productivity. It also delays the eventual use

of the facility for the public. The state spends significant resources toward investigation, review of resubmittal, and review of removed work. (Sometimes even the permanent work that was damaged due to the failure).

Even if the values are too conservative, there are cost impacts as well. Assuming we could relax the stress limits by 5% on the millions of Board Feet (BFT) of lumber used each year, and with a lumber cost of \$2.50 / BFT and an assumed replacement rate of 10%, (5 years to replace a contractor inventory) a saving of \$250,00 per year could be realized. (10Mil BFT X 5% X 20% X \$2.50 = \$250K per year)

VI – Related Research

None known.

VII – Deployment Potential

The Departments Standard Specifications and Falsework Manual will be updated based on project results.